



A bridge hallmark is reached when the first of two caissons is towed into position.

*It's not just a man's world anymore: On the Narrows Bridge Project, women comprise nearly 10 percent of the workforce, performing as field engineers, ironworkers, welders and carpenters.*



Crisscrossing trusses of the 1950 bridge frame new caisson construction below.

View of the east anchorage fully excavated.



During caisson construction crews worked into the night placing concrete.

Crews install one of two anchor frames into the Tacoma anchorage



A view of the east bridge tower from the shores of the Tacoma Narrows (Peninsula side)

Air domes come out so that dredging can begin. During construction and prior to touchdown on the seabed, the caisson's 15 air domes kept the massive box both water tight and afloat.



New 24th Street Bridge opens to traffic one year ahead of schedule.

Dredging beneath the caissons. Crews dredge the seabed below the Gig Harbor caisson so that it will sink an additional 57 feet and reach its final position.



Ground Breaking



Completing Design

## NEW BRIDGE VITAL STATISTICS

**Bridge length:**  
5,400 ft. (overall )

**Main span:**  
2,800 ft. (tower-tower)

**Deck Panels:**  
46 sections, 120 ft. by 78 ft.

**Tower Height:**  
510 ft. tall  
8,000 cubic yds. concrete

**Tower Foundations  
or Caisson:** (each)  
- 130 ft. wide by 80 ft. long  
- 330,000 lbs. steel  
(base or cutting edge)  
- 6 million lbs. rebar  
- 35,000 cubic yards concrete

**Anchorage** (each):  
- 23,000 cubic yards concrete  
- 90 million lbs.

**Cable Diameter:**  
21 inches

**Steel Bundles per Cable:** 19

**Wires per Bundle:** 464

**Steel:**  
40.3 mil. lbs. (entire bridge  
excluding towers)

# The New Tacoma Narrows Bridge

**NEW BRIDGE COMPLETION DATE: EARLY 2007**

**1950 BRIDGE (RETROFIT) COMPLETION DATE: EARLY 2008**

In the 18 months since the Washington State Department of Transportation began the Tacoma Narrows Bridge Project, the overall project is nearly 35 percent complete. The \$849 million project consists of constructing a parallel suspension bridge, 3.4 miles of roadway on State Route 16, and improvements to the existing bridge. The new bridge will open to traffic in spring 2007 with the entire project finishing in early 2008.

Currently, the Tacoma Narrows Bridge (TNB) is the world's largest suspension bridge under construction. The TNB project represents only the second suspension bridge to be built in the United States in four decades.

## Safety and reliability come first

Constructing what will be the third bridge to span the Tacoma Narrows will improve the safety of motorists and freight carriers who travel on State Route 16.

When the second bridge was built in 1950, it was intended to handle 60,000 vehicles a day, not the 90,000 that travel the roadway today. Engineers estimate 120,000 vehicles will use the bridges by 2020. The new bridge project will improve the ability of people and freight to move safely, reliably and conveniently during any hour of the day.

## AT A GLANCE

**Project Scope:**  
3.4 miles of roadway (including deck)

**Boundaries:**  
Jackson Avenue NW (Tacoma) to just west of new 36th Street NW (Key Peninsula)

**Start Date:**  
Broke Ground October 2002

**New Bridge Completed:** Spring 2007

**1950 Bridge Retrofit Completed:** Early 2008

**Owner:**  
Washington State Department of Transportation

**Contractor:** Tacoma Narrows Constructors  
(Joint venture: Bechtel and Kiewit)

**Cost of Project:** \$849 million

**Part Paid By Tolls:** \$800 million

**Expected Toll:** \$3 roundtrip (per vehicle)

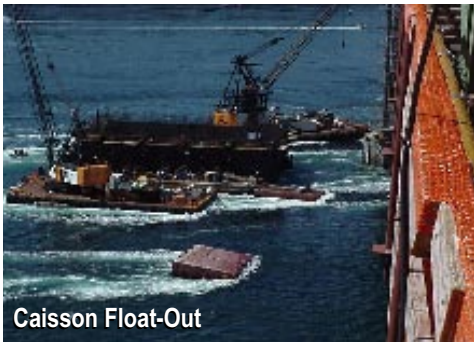




Begin Roadway Construction



Cutting Edge Launching



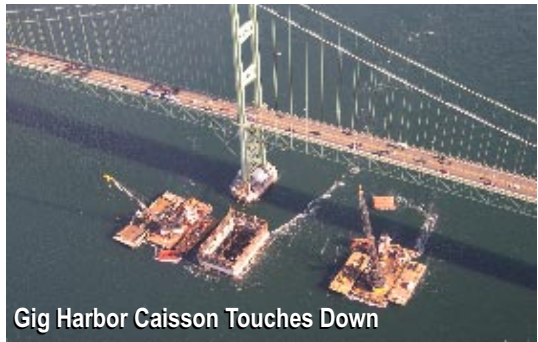
Caisson Float-Out



Completed 24th Street NW Overpass



Tacoma Anchorage Construction



Gig Harbor Caisson Touches Down

## BRIDGE CONSTRUCTION TIMELINE

### 2002

**September:** WSDOT and Tacoma Narrows Constructors start work; design of third Narrows Bridge begins

**October:** Groundbreaking ceremony held October 5

### 2003

**January:** Roadway construction related to new bridge begins

**March:** First cutting edge launched from Seattle for delivery to Port of Tacoma

**April:** Second cutting edge launched from Seattle for delivery to Port of Tacoma

**July/August:** Caissons (bridge foundations) towed into Narrows

**September:** New 24th Street NW underpass opens

**October:** Westbound SR 16 ramps at 24<sup>th</sup> Street NW open to traffic; East anchorage fully excavated and concrete pour begins

**December:** Gig Harbor caisson reaches seabed: 1st Touch Down

### 2004

**January:** Tacoma caisson reaches seabed: 2nd Touch Down; West anchorage fully excavated

**February:** Deck and suspension cable fabrication begin in Korea; West anchorage concrete pour begins

**March:** Air domes cut out of both caissons, and dredging begins

**May/June:** Caissons reach full height and are sealed

**June:** Narrows Park (formerly Doc Weathers) reopens as official bridge viewing site

**July:** Tower construction begins

### 2005

**April:** Tower construction and anchorages to be completed

**August:** Suspension system underway with cable spinning

### 2006

**February:** Deck construction begins

### 2007

New bridge complete in spring and opens to traffic

### 2008

Existing bridge retrofit complete; eastbound traffic on new bridge and westbound traffic on old bridge

## Parallel bridges mean new traffic configuration

A suspension bridge is the bridge style structural engineers use to cross the longest spans. The existing 1950 bridge, a mile in length, is the fifth longest bridge in the United States. The new parallel bridge will be just as long and a mere 60 feet south the current bridge.

In 2007, eastbound traffic to Tacoma will travel across the new bridge while the existing bridge undergoes a seismic retrofit that will improve its performance during an earthquake.

Each bridge will be configured to provide two general-purpose and one high occupancy vehicle (HOV) lane. The 1950 bridge will have three 12-foot lanes with 2-foot inside and 8-foot outside shoulders. The new bridge will have three 12-foot lanes and 10-foot inside and outside shoulders.

The two bridges will function in tandem with the State Route 16 corridor improvements\* and, ultimately, ease traffic congestion across the Narrows.

*\*Starting in spring 2004, major roadway improvements along SR 16 will occur between Tacoma's Nalley Valley Viaduct and 36th Street NW near Gig Harbor.*

## Getting the project done on time and within budget

No matter what the project, the Washington State Department of Transportation makes every effort to complete new construction on project on time and on budget. The Narrows Bridge Project features a new contract method in Washington state called "design build". Under this type of contract, project design and construction take place simultaneously under one contract. The project's contractor, Tacoma Narrows Constructors, is moving at an amazingly fast pace. Because construction is concurrent with design, the timeline for the TNB project is a *full two years shorter* than if the state had pursued a typical contract. Under a typical "design-bid-build" contract, bridge design would be near complete. Construction would not have begun.

Transportation officials have developed three measures for the TNB project with which to evaluate the efficiency of design-build contracting. They include:

- Schedule comparisons between traditional contract methods and the design-build method
- Project management and oversight of budgets (percentage of total capital costs)
- Contingency budget oversight (as a percent of total capital costs)

## Right on schedule

Tacoma Narrows Constructors reached several milestones during the first full year of design-build construction. Structural engineers finished all aspects of bridge design; crews towed out and constructed the bridge foundations (caissons); the caissons were positioned on and embedded into the seabed; east and west anchorage sites were fully excavated and concrete pours begun. In addition, land crews completed major roadwork integral to the bridge project. Design engineers continue to finesse landscaping plans for the 2.3 miles of right-of-way adjacent to SR 16.

More bridge hallmarks are on the way. But to date, the project is right on schedule.

## Project cost summary

The capital cost for the Tacoma Narrows Bridge project is \$760.4 million. The chart below illustrates project budget and expenditures to date. Financing costs and reserve debt service (\$88 million) associated with construction, brings the total projected cost of the project to \$849 million.

Project Cost Summary (in Millions):	Budgeted	Expended
Design-Build Contract	615.0	303.9
Toll System Contract	9.2	1.3
WSDOT Oversight	41.0	7.3
Contingencies	54.7	4.1
Phase I Dev. Cost (UIW)	40.5	39.9
Total	760.4	356.5
<b>Total Expended/Total Cost</b>		<b>46.8%</b>

*Expenditures as of February 2004.*

## BRIDGE BITES

- The new bridge is only the second suspension bridge to be built in the United States in 40 years after Oakland's Carquinez Bridge (Fall 2003).

- The parallel Narrows bridges will be 60-feet apart. Planners chose close placement to lessen environmental effects and the effects of underwater erosion.

- About a million direct labor hours will be required to complete the bridge.

- The new bridge (caissons and foundations) is designed to accommodate a second deck.

- Washington is home to 3,200 bridges, only two of which are suspension bridges: Tacoma Narrows and SR 503 Yale Bridge in Clark County.

For more information about the bridge project:

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